National Institute of Environmental Health Sciences

The coevolution of culture and environment

Author(s): Safarzynska K
Year: 2013
Journal: Journal of Theoretical Biology. 322: 46-57

Abstract:

We propose a model of multi level (group) selection in the presence of climate variability, where environment and culture coevolve. The model describes a population subdivided into groups, each with access to a renewable resource. Individuals employ different harvesting strategies: Defectors harvest more resources than cooperators and punishers. In groups with many defectors, resource extraction may exceed the level of sustainable harvests, causing resource exhaustion. Weather shocks accelerate resource scarcity and eliminate groups with many defectors. The model is used to study conditions under which resource conservation evolves. Conservation is costly but enhances group's chances of survival. We study conditions under which environmental crises enhance the evolution of cooperation. We examine how between-group interactions such as resource-conflict and harvest-sharing affect the probability of resource exhaustion.

Source: http://dx.doi.org/10.1016/j.jtbi.2013.01.004

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security, Food/Water Security

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Model/Methodology:

type of model used or methodology development is a focus of resource

Other Projection Model/Methodology

Other Projection Model/Methodology: Multi level (group) selection in the presence of climate variability

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Long-Term (>50 years)